

DIRECT TESTIMONY
OF
WILLIAM H. ATWOOD, JR., P.E.
WATER ENGINEER

WATER ENGINEERING PROGRAM
SAFETY & RELIABILITY DIVISION
ILLINOIS COMMERCE COMMISSION

AQUA ILLINOIS, INC.

PETITION FOR 20-YEAR METER TESTING VARIANCE
IN AQUA ILLINOIS' VERMILION DIVISION.

DOCKET NO. 13-0412

OCTOBER 10, 2013

WITNESS IDENTIFICATION AND BACKGROUND

Q. Please state your name and business address.

A. My name is William H. Atwood, Jr. My business address is 527 East Capitol Avenue, Springfield, Illinois 62701.

Q. Please describe your present position and its responsibilities.

A. I am presently employed as a Water Engineer in the Water Engineering Program of the Safety & Reliability Division of the Illinois Commerce Commission ("ICC" or "Commission"). My responsibilities include reviewing and analyzing tariff filings related to rates, rules, regulations, and conditions of service for water and sewer service; reviewing applications for certificates of public convenience and necessity; reviewing information regarding the prudence of Qualifying Infrastructure Plant investment costs; reviewing petitions for general increases in rates for water and sewer service; conducting inspections of public water and sewer facilities; reviewing applications for approval of proposed reorganizations; reviewing requests for variances from Commission administrative rules; and presenting expert witness testimony at Commission hearings.

Q. Please describe your professional experience.

A. I have been employed by the Commission since February 2007. Prior to joining the Commission, I was employed by the Illinois Department of Transportation ("IDOT") - Division of Highways/District 6 as a civil engineer for approximately

four and one-half years. Prior to IDOT, I was with a private consulting engineering firm for approximately twelve years where I was project manager on wastewater and water projects. Before my consulting engineering work, I was employed at the Illinois Environmental Protection Agency ("IEPA") - Division of Water Pollution Control as an engineer for approximately six years.

Q. Please describe your educational background.

A. I received a Bachelor of Science Degree in Civil Engineering from the University of Illinois at Urbana-Champaign in 1983. I became a Licensed Professional Engineer ("P.E.") in the State of Illinois in January of 1991.

Q. Please describe your professional affiliations.

A. I am a member of the American Water Works Association ("AWWA") and the Water Environment Federation.

Q. Have you previously provided expert testimony in regulatory matters?

A. Yes. I have previously provided testimony before the Illinois Pollution Control Board while working at the IEPA. I also have previously provided testimony before the Commission on numerous issues related to my responsibilities.

INTRODUCTION

Q. What is the purpose of this proceeding?

A. On June 18, 2013, Aqua Illinois, Inc. ("Aqua" or the "Company") filed a Petition ("Petition") for a variance from 83 Ill. Adm. Code 600.340 which would authorize a 20-year testing period for the 5/8-inch size water meters in its Vermilion Division.

Q. Why is Aqua seeking a variance from the 10-year period for 5/8-inch meter testing in its Vermilion Division?

A. The Company states that it has conducted testing of a random sample of 15 year old and 20 year old 5/8-inch water meters which demonstrates that a 20-year meter testing period is reasonable and appropriate for the Vermilion Division. Aqua states that less frequent testing will benefit customers as testing costs will decrease, and that customers may experience fewer inconveniences associated with meter testing. (Pet. at 2; Aqua Ex. 1.0 at 7-8:150-157.)

Q. What is the current testing period for the 5/8-inch size water meters in Aqua's Vermilion Division?

A. The Company is currently required to test 5/8-inch water meters every 10 years. Water meter testing frequency is governed by 83 Ill. Adm. Code 600.340 ("Section 600.340"). It states:

Unless otherwise approved by the Commission, each service water meter shall be periodically inspected and tested in accordance with the following schedule, or as often as the results may warrant, to insure that the meter accuracy is maintained within the limits set out in Section 600.310:

$\frac{5}{8}$ inch meter – 10 years or for each 100,000 cubic feet registered
 $\frac{3}{4}$ inch meter – 6 years or for each 300,000 cubic feet registered
1 inch meter – 6 years or for each 300,000 cubic feet registered

Meter 1½ inch and over – 4 years

83 Ill. Adm. Code 600.340.

Q. Does Aqua have any other requests related to the proposed variance?

A. Yes. The Company is requesting that it be allowed to either replace the 5/8–inch water meters with 20 years of service in the Vermilion Division with new meters, or test, recondition and return the 20-year meters to service, unless otherwise requested by the customer. (Aqua Ex. 1.0 at 6-7:121-131; Pet. at 2.)

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to provide Staff's position on whether or not Aqua's requested variance for a 20-year testing period for 5/8-inch water meters is appropriate for the Vermilion Division.

Q. What information have you reviewed with respect to Aqua's requests in this proceeding?

A. I have reviewed the Company's Petition; the Direct Testimony of Company witness Robert Ervin (Aqua Ex. 1.0), including attached Exhibits; Aqua's Responses to Staff Data Requests; and the AWWA Manual M6 - "Manual of Water Supply Practices: Water Meters - Selection, Installation, Testing, and Maintenance", ("AWWA M6") Chapter 5 – "Testing of Meters – Test Procedures and Equipment".

99 **VARIANCE**

100

101 **Q. Do you find the Company's use of partial meter population samples for**
102 **testing acceptable?**

103 A. Yes, as long as the sample sizes meet certain statistical sampling requirements.
104 There are no guidelines or requirements in the Public Utilities Act nor Title 83 of
105 the Illinois Administrative Code regarding the use of partial meter populations for
106 sample testing of water meters. However, the Administrative Code does allow
107 for the statistical sampling of gas meters within Section 500.215, and for electric
108 meters in Section 410.180. In addition, AWWA M6 (AWWA M6 at 59-60)
109 suggests the use of statistical sampling for water meter testing programs. Also,
110 in ICC Docket No. 08-0277, the Commission agreed with Staff that the use of a
111 statistical sampling testing methodology was acceptable. Illinois-American Water
112 Co., ICC Order Docket No. 08-0277 at 5 (August 4, 2009).

113

114 **Q. What is your opinion of the sample population sizes of 15-year old and 20-**
115 **year old water meters that were tested by Aqua?**

116 A. I believe the population sizes of 55 15-year old 5/8-inch water meters and 69 20-
117 year old 5/8-inch water meters tested by the Company are adequate sample
118 sizes. This is based on guidelines contained in Military Standard 105-D
119 "Sampling Procedures and Table for Inspection by Attributes" ("Mil Std 105").
120 The use of Mil Std 105 is required for sampling gas meters by 83 Ill. Adm. Code
121 500.215(b) and (c); and is allowed for sampling of electric meters in 83 Ill. Adm.

Code 410.180(a)(4).

According to Aqua's Response to Staff Data Requests WHA 1.03 and 1.04, there were 202 15-year old 5/8-inch water meters and 225 20-year old 5/8-inch water meters in service in the Vermilion Division in 2013. 83 Ill. Adm. Code 500.215(b) and (c) requires the use of Inspection Level II of Mil Std 105. Inspection Level II is considered by Mil Std 105 to be the level normally used. The resulting sample size required by a single sampling plan at Inspection Level II for meter populations ranging from 151 to 280 is only 32 meters.

Q. Please discuss the water meter testing and the test accuracy requirements.

A. The 5/8-inch water meters were tested in accordance with 83 Ill. Adm. Code 600.310 ("Sec. 600.310") which includes certain requirements for testing cold water meters related to AWWA standards. (Aqua Ex. 1.0 at 4:69-74.) As required by Sec. 600.310, 5/8-inch water meters were tested at three different flow rates, a minimum flow rate of $\frac{1}{4}$ of a gallon per minute ("gpm"), an intermediate flow rate of 2 gpm, and a maximum flow rate of 15 gpm.

The test accuracy limits in Sec. 600.310 are:

	<u>NEW METERS</u>	<u>REPAIRED METERS</u>
MINIMUM RANGE	95-101.5%	90-101.5%
INTERMEDIATE RANGE	98.5-101.5%	98.5-101.5%
MAXIMUM RANGE	98.5-101.5%	98.5-101.5%

Unfortunately, these limits don't specify the accuracy for in service meters that are removed for periodic testing to determine if they need to be repaired or replaced. However, Table 5-1 in AWWA M6 does have such accuracy limits, for displacement meters they are:

Normal Test Flow Rates

96-102%

Minimum Test Flow Rates

80-102%

Q. Please discuss the water meter testing results.

A. I evaluated the test results of the 55 15-year old 5/8-inch water meters and the 69 20-year old 5/8-inch water meters in Aqua Exhibit 1.2. I initially included the test results from three water meters that were found not to be testable since they were removed as part of the meter sample population to be used for testing. One of the untestable meters was in the 15-year group, the other two were in the 20-year group.

In both the 15-year group and 20-year group, all meters except the three untestable ones met the intermediate and maximum test flow rate accuracy limits for new or repaired meters in the Sec 600.310 table given above. The same meters also met the normal test flow rate accuracy limits of Table 5-1 of AWWA M6.

Regarding minimum test flow rate, in the 15-year group, eleven meters fell below the 95% accuracy limit for new meters in the Sec. 600.310 table, four meters fell below the 90% accuracy limit for repaired meters in the Sec. 600.310 table, and

two meters fell below the 80% accuracy limit of Table 5-1 of AWWA M6. Of the 20-year group, thirteen meters fell below the 95% accuracy limit for new meters in the Sec. 600.310 table, five meters fell below both the 90% for repaired meters and the 80% accuracy limits given in the tables for minimum test flow rate. All failed meter totals include the untestable meters within the specific meter age group.

80% of the 15-year old 5/8-inch water meters passed all of the accuracy limits for new meters in the Sec. 600.310 table. 92.7% of these meters passed all of the accuracy limits for repaired meters in the Sec. 600.310 table. 96.4% of these meters passed all of the accuracy limits for in service meters of Table 5-1 of AWWA M6.

81.2% of the 20-year old 5/8-inch water meters passed all of the accuracy limits for new meters in the Sec. 600.310 table. 92.8% of these meters passed all of the accuracy limits for repaired or in service meters as required in both of the tables given above.

Q. What water meter passing rate is considered acceptable for water meter testing?

A. There are no guidelines or requirements in the Public Utilities Act nor Title 83 of the Illinois Administrative Code regarding an acceptable rate of passing for water meter testing.

187

188 AWWA M6 (AWWA M6 at 59) suggests a water meter passing rate of 95% of the
189 in service accuracy limits in Table 5-1 of AWWA M6 for the minimum and
190 intermediate test flow rates is acceptable. Using Mil Std 105 as required by 83
191 Ill. Adm. Code 500.215 for gas meters, the allowable number of failed meters for
192 the 20-year sample size of 69 5/8-inch water meters used is 12.

193

194 **Q. How does Aqua's 20-year old 5/8-inch water meter testing results compare**
195 **to the AWWA M6 suggested guidelines and 83 Ill. Adm. Code 500.215**
196 **requirements for gas meters?**

197 A. 92.8% of the 20-year old 5/8-inch water meters passed the accuracy limits for in
198 service meters required in AWWA M6, Table 5-1 at minimum test flow rates.
199 This is below the suggested AWWA guideline of 95%. However, if the two
200 untestable meters are disregarded, the sample population size is reduced to 67
201 and the number of failed meters is only 3. The resulting percent of 20-year old
202 5/8-inch water meters passing all of the accuracy limits of Table 5-1 of AWWA
203 M6 is 95.5%.

204

205 The Vermilion Division's 20-year old 5/8-inch water meters tested easily meet the
206 83 Ill. Adm. Code 500.215 gas meter requirements even including the two
207 untestable meters. Only 5 water meters did not meet all test flow accuracy limits;
208 however, 12 failed meters would be allowed for the 20-year meter population to
209 pass the gas meter requirements.

210

211 **Q. What is your conclusion regarding Aqua's request for a variance from 83 Ill.**
212 **Adm. Code 600.340 which would authorize a 20-year testing period for the**
213 **5/8-inch size water meters in its Vermilion Division?**

214 A. Given the findings in the preceding paragraph, and further considering that the
215 two failed, untestable meters would likely have been removed from service due
216 to zero readings, I believe that the Company should be allowed to use a 20-year
217 frequency of testing for the 5/8-inch water meters in its Vermilion Division.

218

219 **Q. What is your opinion regarding Aqua's request to either replace the 20-year**
220 **meters; or test, recondition and return them to service?**

221 A. The Company should be allowed either option. However, any 20-year old meters
222 returned to service are more likely to lose accuracy as they age further.
223 Therefore, I recommend that any 20-year old 5/8-inch water meters returned to
224 service either be replaced; or tested, repaired and returned to service after an
225 additional 10 years of service, or at a total time in service of 30 years.

226

227 **Q. Do you have any other concerns regarding meter testing at Aqua's**
228 **Vermilion Division?**

229 A. Yes. Besides periodic water meter testing based on a meter's age, 83 Ill. Adm.
230 Code 600.340 also contains requirements based on the volume of water passed
231 through a meter. The age and volume requirement for 5/8-inch water meters is
232 10 years or 100,000 Cubic Feet ("CF"). The corresponding volumes registered

for 15-year old meters is 150,000 CF and for 20-year old meters is 200,000 CF. Several of the meters in Aqua's study had registered volumes in excess of the corresponding 15-year and 20-year ages. In addition to replacing or testing meters at a 20-year service life, I recommend that Aqua actively track water meter registration volumes and replace or test meters once they reach 200,000 CF.

RECOMMENDATIONS

Q. What are your recommendations to the Commission with respect to Aqua's request for a 20-year testing period variance for the 5/8-inch water meters in its Vermilion Division?

A. I recommend the Commission find that:

(1) Aqua has shown that a 20-year testing period for 5/8-inch water meters is appropriate for the Vermilion Division.

(2) Aqua is to track the volume of water registered by its 5/8-inch meters in the Vermilion Division and either replace or test any meters that have reached 200,000 CF prior to their 20-year service life.

(3) For 5/8-inch water meters that have reached a 20-year service life or registered a volume of 200,000 CF in the Vermilion Division, Aqua has the option of either replacing them with new meters; or testing, reconditioning and returning them to service, unless otherwise requested by the customer.

256

257 (4) 20-year old 5/8-inch water meters that are tested, reconditioned and
258 returned to service in the Vermilion Divison shall either be replaced with new
259 meters; or tested, reconditioned and returned to service after an additional 10-
260 years of service or an additional 100,000 CF registered volume of water.

261

262 **Q. Does this conclude your prepared direct testimony?**

263 **A. Yes.**